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TWO CURRANT APHIDS

That Migrate to Willow-herbs

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BULLETIN 336

TWO CURRANT APHIDS

That Migrate to Willow-herbs[1]

By Edith M. Patch

THE VARIABLE CURRANT APHID[2]

Of the aphids common on currant bushes, one of the most abundant and destructive species is the variable currant aphid. Shoots colonized by these insects become stunted and the leaves are distorted. A heavy infestation causes dwarfed bushes and prevents the proper setting of fruit.

The variable currant aphid is not confined to cultivated currants. The writer has found its spring colonies on five species of currants and gooseberries in Maine.

Seasonal History and Description. The egg overwinters on a currant or gooseberry bush (*Ribes*). In Maine the stem-mother, that is the form which hatches from an overwintering egg, becomes full grown early in May if weather conditions are favorable. When mature she is dark purplish green with a black tail and conspicuous chalk-white cornicles (the two tubes near the tail). She is wingless and her antennae are 5-jointed. During her growth she stations herself on the underside of a leaf which becomes puckered from the injuries caused by her feeding punctures. There, in the protecting irregularities of the leaf she has deformed, she gives birth to numerous progeny, all females.

When first born these daughters have 4-jointed antennae but the number of joints is increased to 5 at a subsequent molt and again to 6 at the last molt. Like the stem-mother, the members of the second spring generation are wingless.

As these insects reproduce rapidly, the colony soon becomes too numerous to be sheltered by a single leaf so its members scatter to infest the growing shoot and fresh leaves. A thriving colony seriously distorts the shoot and causes the misshapen leaves to cluster in a dense protecting mass.

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[1]Papers from the Maine Agricultural Experiment Station: Entomology No. 120.

[2]*Aphis varians* Patch.

In June the young aphids of the third generation are found bunched so thickly along the new shoots that there is hardly room for them to plunge their greedy beaks into the stalk. At this time some individuals are pale bright tan and some are gray, the color apparently depending on the length of time from the previous molting. When the individuals of the third generation become mature part of them are wingless and part, unlike the two preceding generations are winged. Both the winged and wingless forms are females.

A mature wingless female of the third generation is dark green with conspicuous chalk-white cornicles and a black tail. The abdomen, near its tip, is transversely striped with black. The colony of such individuals in a mass, however, has a slaty appearance because of a deposit of fine white waxy powder secreted by the aphids. Individuals containing parasites are often present and their bodies become globular, tan colored objects, the cornicles of which remain white.

The wingless ones, naturally, stay on the currant; but the others, soon after their wings are developed, leave the over-wintering and spring host plant for vegetation of an entirely different nature for a place of summer residence for themselves and their progeny. Because of this habit these winged forms are called spring migrants. A spring migrant has a black head and thorax and a dark green abdomen with black transverse bands near the cornicles. The cornicles, unlike those of the wingless forms, are dark. On the antennae are a varying number of circular sensoria (sense spots) an arrangement of which is indicated in Figure 1, A, of this bulletin. The hairs on the antenna are delicate and not easily seen under the microscope except in carefully prepared mounts. There are about 20 hairs on the third segment and they are longer than the width of the segment.

When the spring migrants leave the currant or gooseberry bushes (*Ribes*) they are attracted by willow-herbs (*Epilobium*) and alighting on these plants they establish summer colonies on succulent rapidly growing parts, especially favoring the buds at the tips of the blossom shoots.

The fact of the migration of the variable currant aphid from *Ribes* to *Epilobium* was established by the writer in 1921 by experimental transfers. Winged aphids about to take flight from *Ribes* were placed on willow-herbs which they accepted, feeding

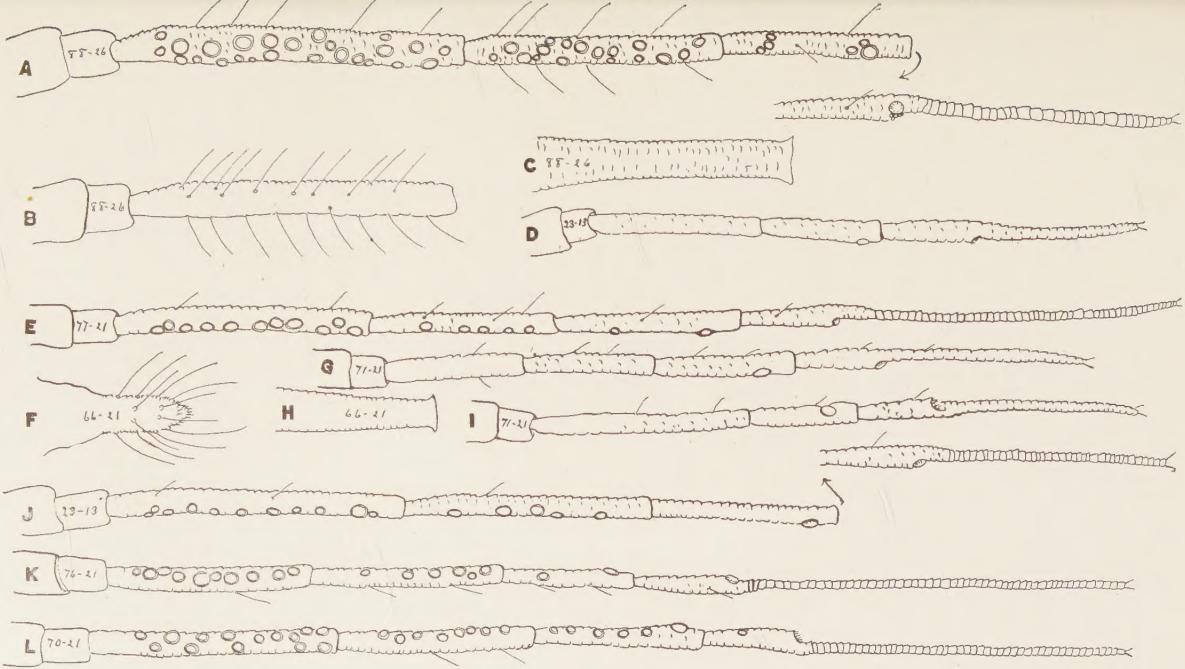


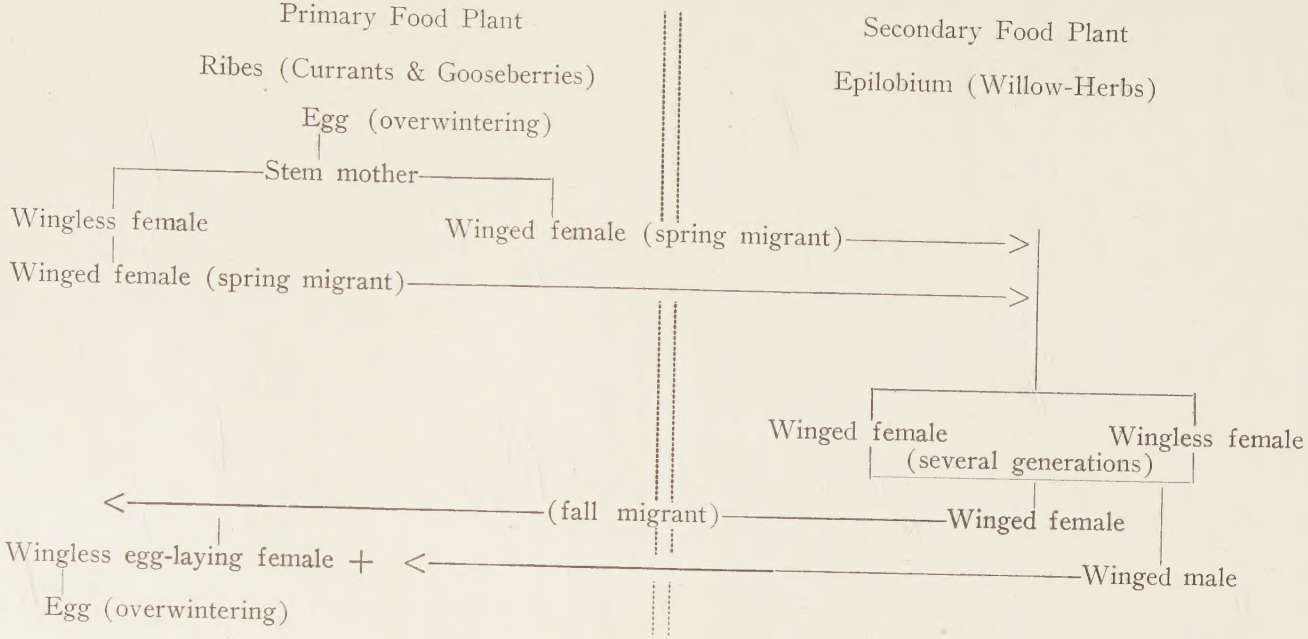
FIG. 1. A. to C. The variable currant aphid: A, Antenna of winged female showing sensoria. B, The third segment of same antenna as A showing the other side on which there are no sensoria. The approximate arrangement and number of hairs are indicated. C. Cornicle of winged female. D to L. The green gooseberry aphid: D, Antenna of stem female. E, J, K, L, Antennae of winged females. G, I, Antennae of wingless summer females. F, Cauda of winged female. H, Cornicle of winged female. All drawings made to same magnification.

on them quietly and depositing young which, after becoming mature, in turn deposited their young on the willow-herbs. Two species of willow-herbs were used in the experiment: the great willow-herb or fireweed (*Epilobium angustifolium* L.) and the purple-leaved willow-herb (*E. coloratum Muhl.*) and on both of these the spring migrants and their progeny thrived. The colonies thus secured under experimental conditions were like those commonly found during the summer on willow-herbs. The writer had for some time suspected that the variable currant aphid and the similar aphid on willow-herbs were the same species. Their identity was suggested by the characteristic white cornicles of the wingless forms and by the fact that structurally they were indistinguishable by microscopic examination.

Late in the summer or fall winged females leave their summer food plants and find their way to currant or gooseberry bushes where they establish fall colonies. In such colonies are developed wingless egg-laying females. Winged males fly over from the willow-herbs and mate with these oviparous females which subsequently deposit the over-wintering eggs on the currant or gooseberry bushes, thus completing the annual cycle.

THE NAME OF THE VARIABLE CURRANT APHID. When the writer, in 1914, described this species as *Aphis varians,* its summer food habits were not known. When the fact of its migration to willow-herbs became established, it was compared with descriptions of aphids previously recorded from willow-herbs. Kaltenbach, in 1843, described *Aphis epilobii* collected in Germany from *Epilobium angustifolium* as having white cornicles (*"die Röhren sind weisslich"*) in the wingless forms. Later Koch described *"Aphis epilobii* Kaltenbach" with black cornicles in the wingless forms. Buckton applied the name *"Aphis epilobii* Kaltenbach" to an English aphid having drab-yellow cornicles in both the wingless and winged forms. There seems to be a possibility that *Aphis varians* may be the same species as that described by Kaltenbach but certainly not those indicated as *"Aphis epilobii"* by Koch and Buckton. However, the life cycle of *Aphis epilobii* Kaltenbach is not known, and much confusion apparently still exists concerning its identity in European collections and literature. When the identity of *Aphis epilobii* is established and its life cycle traced, there will be a basis for comparison wth *Aphis varians* and it will be possible to know whether the variable currant aphid is or is not the same as the willow-herb species described by Kaltenbach in Germany.

Life Cycle of the Variable Currant Aphid



THE GREEN GOOSEBERRY APHID[3]

Common on wild gooseberry bushes and occurring also on cultivated gooseberry and currant is a small species of aphid whose colonies distort the spring foliage.

The wingless females are pale green with cornicles paler than the body. A representative of the first generation, hatching from the overwintering egg, has antennae of five segments. The second generation aphids, also wingless, have antennae with six segments. The summer wingless females have antennae with five or with six segments, the difference perhaps indicating different generations. The number and arrangement of the sensoria in the antennae of the winged females is variable as is indicated by the drawings in Figure 1. The proportionate length of the different segments varies greatly. The antennal hairs are few and scattered and their length does not exceed the width of the segment which bears thm. There are usually four pairs of lateral hairs on the cauda.

The seasonal history of the green gooseberry aphid is similar to that of the variable currant aphid as its spring migrants seek willow-herbs in early summer and the fall migrants return to the primary food plant late in the season. Experimental evidence of the migration of this aphid between *Ribes* and *Epilobium* was obtained by the writer in 1921. The plants used in the experimental transfers were the linear-leaved willow-herbs (*Epilobium lineare* Muhl.), the purple-leaved willow-herb (*E. coloratum* Muhl) and the northern willow-herb (*E. adenocaulon* Haussk.). The aphids were found colonizing these same species out of doors.

CONTROL MEASURES

Spring Treatment: Spraying the currant or gooseberry bushes in spring with nicotine sulphate in water should kill the aphids before their damage to the bushes becomes excessive. After hatching from the overwintering eggs the aphids are present in these bushes for more than a month before migration takes place. Since, however, the infested leaves soon become distorted in such a way as to protect the insects, an early application is desirable. The cost of concentrated nicotine sulphate is considerable,

[3] *Aphis sanborni* Patch.

but it is diluted to such an extent that its use is not an expensive treatment for currant aphids. The 40 per cent nicotine sulphate may be used at the rate of three-fourths of a pint to 100 gallons of soft water in which 4 or 5 pounds of soap has been dissolved. When a small quantity of spray is needed, the nicotine sulphate may be used at the rate of 1 teaspoonful to a gallon, or 1 ounce to 8 gallons of soapy soft water.

Summer Treatment: The destruction of willow-herb plants in the vicinity of currant gardens is, in some locations, a practical combative measure as in this way the variable currant aphid and the green gooseberry aphid are deprived of vegetation necessary for summer colonies. Whether this is feasible depends upon such local conditions as the abundance of the summer food plant and the cost of its eradication with reference to the value of the fruit to be protected.

Fall Treatment: After the migration from the willow-herbs to the currant (or gooseberry) bushes late in the summer the aphids colonize the bushes for several weeks before the leaves fall. The fall colonies do not cause a distortion of the foliage. At this time spraying with nicotine sulphate should kill the aphids, thus preventing an infestation in the spring.

All aphids are subject to attack by predaceous and parasitic insects and disease. When such natural controls are present in sufficient numbers no artificial remedial measures are necessary.

LIST OF CURRANT AND GOOSEBERRY APHIDS

britteni (Theobald), *Amphorophora.* 1925. Mason, Proc. U. S. Natl. Mus. Vol. 67, p. 14.

cosmopolitana Mason, *Amphorophora.* (*lactucae* Kaltenbach). 1925. Mason, Proc. U. S. Nalt. Mus. Vol. 67, p. 16; 1926. Theobald, Aphididae of Great Britain, Vol. 1, p. 199.

cynosbati (Oestlund), *Catamergus.* 1919. Davis, Canad. Ent. Vol. 51, p. 234.

dispar Patch *Myzus.* 1919. Haviland, Proc. Roy. Soc. Edinburgh. Vol. 39, p. 90.

grossulariae Kaltenbach *Aphis.* 1919. Haviland, Proc. Camb. Phil. Soc. Vol. 19, p. 266-269.

hayhursti Mason, *Amphorophora.* 1925. Mason, Proc. U. S. Natl. Mus. Vol. 67, p. 32.

houghtonensis (Troop) *Catamergus.* 1919. Davis, Canad. Ent. Vol. 51, p. 234.

lactucae (Linn.) *Macrosiphum.* 1926. Theobald, Aphididae of Great Britain, Vol. 1, p. 302.

neomexicanus (Cockerell), *Aphis.* 1920. Quaintance and Baker, U.S.D.A. Farmers' Bul. 1128, p. 33.

pergandei Mason, *Amphorophora.* 1925. Mason, Proc. U. S. Natl. Mus. Vol. 67, p. 49.

ribesina van der Goot, *Rhopalosiphum.* 1915. van der Goot, Beitrage zur Kenntnis der Hollandischen Blattlause, p. 145.

ribis (Linn.), *Myzus.* 1919. Haviland, Proc. Roy. Soc. Edinburgh. Vol. 39, pp. 78-112.

sanborni Patch, *Aphis.* 1927. Patch, Me. Agr. Exp. Sta. Bul. 336, p. 6.

soror B. et B., *Eriosoma.* 1914. Borner, Die Blutlausplage und ihre Bekampfung. Kaiserliche Biologische Anstalt fur Land und Forstwirtschaft. Footnote, p. 2.

spiraecola Patch, *Aphis.* This species frequently colonizes tender growth of *Ribes* for a few weeks during the summer.

ulmi (Linn.), *Eriosoma.* 1924. Glendenning, Proc. Ent. Soc. Brit. Columbia, pp. 33-40.

varians Patch, *Aphis.* 1927. Patch, Me. Agr. Exp. Sta. Bul. 336, p. 1.

whitei Theobald, *Myzus.* 1919. Haviland, Proc. Roy. Soc. Edinburgh. Vol. 39, p. 90.

FIG. 2. *Above*, shoot of currant distorted by the variable currant aphid. *Below*, shoot of gooseberry distorted by the green gooseberry aphid.